REMARKS

The rejections presented in the Office Action dated January 29, 2007, have been considered. Claims 1-22 are pending in the application. Reconsideration and allowance of the application are respectfully requested.

The Office Action fails to show that claims 1-22 are anticipated by US patent pub. 2002/0106084 to Azuma et al. ("Azuma") under 35 U.S.C. §102(b). The rejection is respectfully traversed because the Office Action fails to show that all the limitations of the claims are taught by Azuma; the cited portions of the Azuma reference do not correspond to the limitations as suggested in the Office Action.

Beginning with the rejection of independent claim 1, the Office Action cites to paragraphs 0004, 0006 and 0007 of the Azuma reference as anticipating all of the claimed limitations. However, these cited portions of the Azuma reference fail to describe or even mention various claimed limitations. For instance, Azuma fails to disclose limitations directed to defining at least two selectable actions respectively identified by first and second quantum states, detecting a state of one of at least two quantum-entangled particles (whereby the state of the other particles is fixed), and performing one of the predefined actions. Azuma also fails to describe or mention limitations directed to sending a respective one of at least two quantum-entangled particles to each of at least two nodes. The following more particularly addresses the cited portions of the Azuma reference and their lack of correspondence to the claimed limitations.

The Azuma reference is generally directed to an encryption method for sending communications from a sender to a recipient using an arbitrary quantum state. Azuma describes in its background (to which the Office Action cites) related approaches to the secure communication of data. Referring to cited paragraphs 0004 and 0005, Azuma describes a well-known key distribution method called "BB84." According to Azuma, this BB84 approach involves the random selection of a photon state by a sender, who chooses from four states with two related bases (each basis corresponds to two of the four states), with a selected photon sent to the recipient with the purpose of ensuring secure data communication. The recipient randomly selects one of the bases to use in

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observing the photon. This process is repeated, and related data sent with the photon communication is adapted (*e.g.*, accepted as a secure communication) when the bases selected by the sender and recipient match. A probability approach is used to detect the presence of an eavesdropper (*i.e.*, somebody intercepting, observing, and sending a new photon to the recipient).

Neither of paragraphs 0004 and 0005 refer to quantum entanglement in general, nor do they refer to "generating at least two quantum-entangled particles," sending one of the generated particles to respective nodes, and the related state detection and fixing limitations as claimed. This is consistent with relevant references that describe the BB84 approach, including *C.H. Bennett and G. Brassard* "Quantum Cryptography: Public Key Distribution and Coin Tossing", Proceedings of IEEE International Conference on Computers Systems and Signal Processing, Bangalore India, December 1984, pp 175-179, which is cited in the Azuma reference. In this regard, neither paragraphs 0004 or 0005 correspond to the claimed limitations.

Referring to paragraph 0007, Azuma goes on to describe another approach to the secure transmission of data (with specific application to key distribution) using an approach for detecting an eavesdropper. The sender generates a pair of qubits, observes one qubit using one of two available bases, and sends the other qubit to a recipient. In this regard, a single quantum particle (the qubit) is sent to a single node (the recipient) where it is observed using one of the two bases. Results obtained when both bases match are adapted as data and further used to detect an eavesdropper. In this regard, a determination as to whether the bases match must also be made in order to adapt received communications as data (*e.g.*, with the determination made via a public channel, such as described in paragraph 0006 in the Azuma reference). While entanglement is mentioned, paragraph 0007 does not describe claimed limitations directed to defining actions in accordance with quantum states, and selecting and performing an action as a function of the detected state. In this regard, the discussion in paragraph 0007 appears limited to simple key distribution with detection of the presence of an eavesdropper, as is the discussion in paragraphs 0004 and 0005.

Applicant has further reviewed the Azuma reference and cannot ascertain any description of the coordination of actions using the quantum entanglement of particles,

nor can the Applicant ascertain any correspondence to the generation of quantum-entangled particles and communication different ones of the entangled particles to separate nodes. Azuma's focus is to ensure that data is actually transferred from a sender to a recipient (*i.e.*, by facilitating the detection of any eavesdroppers) with a single quantum particle transmission; this transmission must be from a sender to a recipient. Azuma's discussion of a quantum state, entangled or otherwise, is thus limited to secure communications.

In view of the above, the Office Action has failed to provide correspondence to all of the limitations of claim 1, including those directed to generating and using quantum-entangled particles to coordinate predefined actions, and sending entangled particles to respective nodes. The above discussion is also applicable to the rejections of independent claims 21 and 22, each improperly rejected together with claim 1 by the Office Action under the same rationale. As dependent claims 2-14 depend from claim 1, the Office Action has also failed to provide correspondence to at least those limitations in independent claim 1 as discussed above. Further discussion of the failure of the Azuma reference to disclose other more specific limitations in claims 2-14 is therefore believed unnecessary here. Applicant therefore submits that the Section 102 rejections of independent claims 1, 21 and 22, and of claims 2-14 that depend from claim 1, are improper and should be removed.

Referring to independent claim 15, the Office Action again cites to paragraphs 0004 and 0007 in the Azuma reference as allegedly corresponding to all of the claimed limitations. However, as described above, these paragraphs are limited to using quantum particles or entangled quantum particles in the secure transmission of data, with the quantum particles sent to only one node. These paragraphs do not, for example, describe limitations directed to "generating at least two sets of quantum-entangled particles," and sending one of each set of particles to each of at least two nodes. That is, Azuma describes the generation of particles at a first node and sending a generated particle to a second node. It further appears that only a single set of particles is generated in Azuma, and that the particles are sent only to a single node (recipient).

In addition, the cited paragraphs from the Azuma reference fail to describe limitations in claim 15 that are directed to "generating an output as a function of the detected states." Applicant has reviewed these paragraphs as well as other portions of the Azuma reference and cannot ascertain any teaching or suggestion of such an output. This is consistent with Azuma's purpose and background description, which focuses upon the use of quantum particles for the specific purpose of communicating data securely.

In view of the above, the cited portions of the Azuma reference fail to correspond to the limitations in claim 15. Applicant further submits that the rejections of claims 16-18, which depend from claim 15, are also improper in failing to provide correspondence at least to the limitations in claim 15. Further discussion of the specific limitations in claims 16-18 is therefore believed unnecessary. Applicant therefore requests that the Section 102 rejections of claims 15-18 be removed.

Regarding independent claim 19, the Office Action cites to paragraphs 0004-007 of the Azuma reference as corresponding to limitations similar to those described above. As is consistent with the above discussion of independent claims 1, 15, 21 and 22, these paragraphs fail to provide any correspondence to claimed limitations directed to sending quantum-entangled particles to two nodes, or to coordinating actions. As relevant to specific limitations in claim 19, these cited portions of the Azuma reference fail to describe limitations directed to "sending a respective one of the quantum-entangled particles to each of the first and second nodes." As described above in connection with the rejections of claims 1 and 15, the Azuma reference is directed to sending a quantum particle from a first node to a second node to ensure secure communications between the nodes. There is no discussion in the Azuma reference of sending each of at least two entangled particles to two different locations or nodes, or how such an approach would be applicable in achieving the secure communications to which the Azuma reference is directed.

The cited portions of the Azuma reference also fail to describe limitations in claim 19 that are directed to "executing a response at a coordinated time selected as a function of the detected states of the quantum-entangled particles." There is no discussion of the execution of any function, coordinated or otherwise. Azuma's

described use of quantum particles is specifically to ensure secure communications, and provides no correlation between the quantum particles and the communicated data or any other related function or action.

In view of the above, the cited portions of the Azuma reference fail to provide correspondence to all of the limitations in claim 19. Applicant further submits that the cited portions of the Azuma reference also fail to correspond to the limitations in claim 20, based at least upon its dependence from claim 19. Further discussion of the impropriety of the rejection of claim 20 is therefore believed unnecessary. In this regard, the Section 102 rejections of claims 19-20 are improper and should be removed.

Withdrawal of all of the rejections and reconsideration of the claims are respectfully requested in view of the remarks set forth above. No extension of time is believed to be necessary for consideration of this response. However, if an extension of time is required, please consider this a petition for a sufficient number of months for consideration of this response. If there are any additional fees in connection with this response, please charge Deposit Account No. 50-0996 (HPCO.138PA).

Respectfully submitted,

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